

# Water Quality Impact of Hog Lagoon and Turkey Litter in Loblolly Pine Stands in the Coastal Plain and Sandhills of South Carolina

**Project Description:** Total demand for forest products is anticipated to increase substantially by the year 2030. The southeastern United States will produce 50 percent or more of the world's pulp and paper in the future. Increased demand for wood fiber and alternative forest products coincides with the increasing need to find alternative disposal/recycle/utilization options for various forms of animal waste including swine lagoon liquids and turkey litter. Currently, most of this animal waste is applied to agricultural land. In some localities of South Carolina, agricultural land on which to apply the wastes is becoming scarce. Forested land therefore represents an additional disposal option. When the waste is applied at the agronomic rate, a best management practice for nonpoint source control is being used. A project implemented by Clemson University is determining and demonstrating the proper agronomic rate of application for these two materials. Numerous tree growth studies using municipal wastewater irrigation have shown large wood volume increases of 80 percent to 2000 percent above untreated stands. It is anticipated that similar growth gains can be realized by applying swine lagoon effluent to young loblolly pine stands, the principal tree crop of the southeast, while keeping water quality impacts at a minimum.



Many swine producers are located in the Coastal Plain where wood demand is high and there are extensive stands of pine. Swine producers across the southeast have odor problems in addition to the water quality issue. Established forest stands may also serve as an effective odor barrier, significantly reducing odor-traveling distance. Forest land application of turkey litter can also be a sound method of animal waste use. Many forest landowners in South Carolina have expressed interest in bio-solids and animal waste application in their forest stands to increase tree growth and pine straw production.

Improper application of animal manures to forest land may degrade local groundwater and stream water quality. Proper animal waste application rates for forest land have not been investigated as intensively for forested land as for pastureland. Coastal Plain and Sandhills soils are highly weathered and when unamended are typically marginal in most plant nutrients. Loblolly pine is the tree crop most fertilized. Nitrogen and phosphorus fertilization has often proved beneficial in improving forest stand performance. The plant nutrients in swine effluent and turkey litter can be used to fertilize forest stands. However, proper application levels for these two materials must be used to prevent the leaching of nitrate and trace metals (arsenic and copper) into local groundwater or surface runoff into nearby streams.

The major objective of this project is to determine sound forest application levels of two common animal wastes. It is also looking at ways to reduce aerosol distribution of noxious ammonia. By completion, the project will have established sound hog effluent and turkey litter agronomic rates of application (annual and one-time) in established loblolly pine stands on common South Carolina soils in two physiographic regions of two watersheds.

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**Lead Agency:** SCDHEC/Clemson University

**Funding: EPA 319:** \$125,000 **Matching:** \$83,333

**Project Location:** SC, Clarendon County and Chesterfield County  
Black Creek Watershed

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